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IN THE CLAIMS

1. (Currently Amended) An electrochemical cell system, comprising:

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of ~~opposite~~ the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of ~~opposite~~ the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field, ~~opposite the first electrode~~, wherein the flow field member comprises a porous support having modified to provide a graded ~~selected~~ hydrophobicity, a graded ~~selected~~ hydrophilicity, a combination of a gradedselected hydrophobicity and gradedselected ~~-~~ porosity, or a combination of a gradedselected hydrophilicity and gradedselected porosity.

2. (Original) The electrochemical cell system of claim 1, wherein the porous flow field member comprises a porous support integrated with a polymer or a combination of a polymer and an electrically conductive material.

3. (Currently Amended) An electrochemical cell system, comprising:

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field, wherein the flow field member comprises a porous support having a selected hydrophobicity, a selected hydrophilicity, a combination of a selected hydrophobicity and selected porosity, or a combination of a selected hydrophilicity and selected porosity, and ~~The electrochemical cell system of claim 2,~~ wherein the porous flow field member comprises about 5 wt. % to about 95 wt. % based on the total weight of the mixture of porous support material and about 5 wt. % to about 95 wt. % based on the total weight of the mixture of polymer.

4. (Original) The electrochemical cell system of claim 3, further comprising about 50 wt. % to about 80 wt. % based on the total weight of the mixture of porous support material and about 20 wt. % to about 50 wt. % based on the total weight of the mixture of polymer.

5. (Original) The electrochemical cell system of claim 2, wherein the polymer is selected from the group consisting of a hydrophobic polymer, a hydrophilic polymer, and a hydrophilic/hydrophobic polymer mixture.

6. (Original) The electrochemical cell system of claim 5, wherein the hydrophobic polymer is selected from the group consisting of polytetrafluoroethylene, fluorinated ethylene propylene, polyvinylidinefluoride, ethylene chlorotrifluoroethylene copolymer, ethylene tetrafluoroethylene, perfluoroalkoxy, tetrafluoroethylene perfluoromethylvinylether copolymer, and mixtures comprising at least one of the foregoing hydrophobic polymers.

7. (Original) The electrochemical cell system of claim 5, wherein the hydrophilic polymer is selected from the group consisting of proton conductive ionomers and ion exchange resins.

8. (Original) The electrochemical cell system of claim 2, wherein the electrically conductive material is selected from the group consisting of niobium, zirconium, tantalum, titanium, steel, nickel, cobalt, mixtures comprising at least one of the foregoing materials, and alloys comprising at least one of the foregoing materials.

9. (Currently Amended) The electrochemical cell system of claim 2, wherein the polymer is an ~~elastomer~~elastomeric threaded, woven, or stitched within the porous support.

10. (Original) The electrochemical cell system of claim 9, wherein the porous support is a carbon cloth.

11. (Original) The electrochemical cell system of claim 1, wherein the porous flow field member has a void volume of about 20 % to about 80 % based on the total volume of the flow field member.

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12. (Currently Amended) An electrochemical cell system, comprising:

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field, wherein the flow field member comprises a porous support having a selected hydrophobicity, a selected hydrophilicity, a combination of a selected hydrophobicity and selected porosity, or a combination of a selected hydrophilicity and selected porosity,

The electrochemical ~~cell system~~ of claim ~~1,~~ wherein the porous flow field member comprises a first layer comprising a first layer having a first hydrophobicity, and a second layer having a second, different hydrophobicity.

13. (Original) The electrochemical cell system of claim 12, wherein the first layer comprises a porous support integrated with an elastomeric material, and the second layer comprises a screen.

14. (Original) The electrochemical cell system of claim 13, wherein the elastomeric material is selected from the group consisting of silicones, fluoroelastomers, and combinations comprising at least one of the foregoing elastomeric materials.

15. (Original) The electrochemical cell system of claim 12, wherein the first layer has a first porosity and the second layer has a second porosity.

16. (Currently Amended) The electrochemical cell system of claim 15, wherein wherein the first layer comprises a porous support integrated with an elastomeric material, and the second layer comprises a screen.

17. (Original) The electrochemical cell system of claim 15, wherein the first layer comprises a porous support integrated with an elastomeric material, and the second layer comprises a sintered metal cloth.

18. (Original) The electrochemical cell system of claim 1, wherein the porous flow field member further comprises a catalyst.

19. (Original) The electrochemical cell system of claim 18, wherein the catalyst is selected from the group consisting of platinum, palladium, rhodium, carbon, gold, tantalum, tungsten, ruthenium, iridium, osmium, alloys comprising at least on the foregoing materials, and mixtures comprising at least one of the foregoing catalysts.

20. (Original) The electrochemical cell system of claim 1, wherein the porous support comprises a material that is non-oxidizable at anodic potentials of less than about 4 volts.

21. (Currently Amended) The electrochemical cell system of claim 1, wherein the porous support is a screen, a perforated sheet, a pierced sheet, a sintered metal cloth, an etched sheet, a felt, or a woven mesh comprising a material selected from the group consisting of niobium, zirconium, tantalum, titanium, nickel, cobalt, steel, and alloys comprising at least one of the foregoing materials.

22. (Currently Amended) The electrochemical cell system of claim 1, further comprising a second porous support contacting the first porous support and having a greater void volume than the first porous support, and a third porous support contacting the second porous support on a the side of the second porous support opposite the first porous support, and having a greater void volume than the second seconed porous support.

23. (Currently Amended) The electrochemical cell system of claim 22, wherein each of the porous supports is integrated with an elastomeric ~~elactomeric~~ material.

24. (Original) The electrochemical cell system of claim 23, wherein the elastomeric material further comprises an electrically conductive material.

25. (Original) The electrochemical cell system of claim 23, wherein the electrically conductive material is selected from the group consisting of copper, silver, silver-coated spheres, niobium, zirconium, tantalum, titanium, steel, nickel, cobalt, mixtures comprising at least one of the foregoing materials, and alloys comprising at least one of the foregoing materials.

26-39. (Cancelled)

40. (Currently Amended) An electrochemical cell system, comprising

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of ~~opposite~~ the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of ~~opposite~~ the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field ~~opposite the first electrode~~, wherein the flow field member comprises a sintered metal cloth.

41. (Original) The electrochemical cell system of claim 40, wherein the sintered metal cloth is integrated with a polymer and optionally a catalyst, or a combination of a polymer, an electrically conductive material, and optionally a catalyst, wherein the polymer is selected from the group consisting of a hydrophobic polymer, a hydrophilic polymer, and a hydrophobic/hydrophilic polymer mixture.

42. (Original) The electrochemical cell system of claim 40, wherein the sintered metal cloth comprises a graded porosity.

43. (Original) The electrochemical cell system of claim 40, wherein the sintered metal cloth comprises a first layer having a first porosity and a second layer having a second, different porosity.

44. (Original) The electrochemical cell system of claim 40, wherein the sintered metal cloth comprises a first layer having a first void volume, a second layer having a second, different void volume, and a third layer having a third, different void volume, wherein the first void volume is greater than the second void volume, and the second void volume is greater than the third void volume.

45-49. (Cancelled)

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50. (Currently Amended) In an electrochemical cell comprising a first electrode; a second electrode; a membrane disposed between and in intimate contact with the first electrode and the second electrode; a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of ~~opposite the~~ membrane; a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of ~~opposite the~~ membrane opposite the first side, a method for managing fluid flow comprises

introducing a quantity of fluid into the first flow field;

passing the fluid through a graded, porous flow field member in fluid communication with the first flow field ~~opposite the first electrode~~, wherein the flow field member comprises a porous support having ~~modified to provide a~~ graded ~~selected~~ hydrophilicity, a graded selected hydrophobicity, a combination of a graded ~~selected~~ hydrophilicity and a graded ~~selected~~ porosity, or ~~,~~ a combination of a graded ~~selected~~ hydrophobicity and a graded ~~selected~~ porosity; and

contacting the fluid with the first electrode.

51. (Original) The electrochemical cell of claim 50, wherein the porous flow field member comprises a first porous support having a first void volume, a second porous support having a second, different void volume, and a third porous support having a third, different void volume, wherein the first void volume is greater than the second void volume, and the second void volume is greater than the third void volume.

52. (New) The electrochemical cell system of claim 2, wherein the electrically conductive material comprises carbon nanotubes.

53. (New) The electrochemical cell system of claim 41, wherein the electrically conductive material comprises carbon nanotubes.

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54. (New) An electrochemical cell system, comprising:

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field, wherein the porous flow field member comprises a porous support integrated with an electrically conductive material, wherein the electrically conductive material comprises carbon nanotubes.

55. (New) An electrochemical cell system, comprising:

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field, wherein the flow field member comprises a first porous support having a selected hydrophobicity, a selected hydrophilicity, a combination of a selected hydrophobicity and selected porosity, or a combination of a selected hydrophilicity and selected porosity; a second porous support contacting the first porous support and having a greater void volume than the first porous support, and a third porous support contacting the second porous support on a side of the second porous support opposite the first porous support, and having a greater void volume than the second porous support, wherein each of the first, second, and third porous support is integrated with an elastomeric material.

56. (New) An electrochemical cell system, comprising

a first electrode;

a second electrode;

a membrane disposed between and in intimate contact with the first electrode and the second electrode;

a first flow field in fluid communication with the first electrode, wherein the first electrode is disposed on a first side of the membrane;

a second flow field in fluid communication with the second electrode, wherein the second electrode is disposed on a second side of the membrane opposite the first side; and

a porous flow field member in fluid communication with the first flow field, wherein the porous flow field member has a gradient of porosity, and further wherein the porous flow field member comprises a porous support integrated with an electrically conductive material, wherein the electrically conductive material is selected from the group consisting of niobium, zirconium, tantalum, titanium, cobalt, mixtures comprising at least one of the foregoing materials, and alloys comprising at least one of the foregoing materials.